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INCREASE THE ROLE OF PRODUCTION LABORATORIES IN THE  
STRUGGLE FOR TECHNICAL PROGRESS

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Unsigned article

(A Review of Letters to the Editors)

In the decisions of the July Plenum of the TsK KPSS [Central Committee of the Communist Party of the Soviet Union] a program was designated for further technical progress in the national economy of the Soviet Union. A large role in the struggle for the most rapid mastery and extensive introduction of advanced techniques, improvement and better use of equipment and apparatus, and an increase in the productivity of labor was assigned to the production laboratories.

As the production laboratories solve these important problems, as they reorganize their work in accordance with the increased requirements confronting them, what must be done in order to improve their operation?

The editors posed these questions before the workers of production laboratories at the enterprises of various branches of communications. We publish below a review of letters received from these workers.

Radio enterprises are continually being provided with new, more advanced techniques. The most rapid mastery of these techniques and their introduction into operation is the foremost task of the workers of an enterprise. Production laboratories, containing, as a rule, more highly-skilled specialists, have a leading role in the solution of this task.

What can the production laboratory do to insure trouble-free, high quality operation of radio stations? Comrade Avak'yants, chief engineer of the laboratory of the radio transmitting station of the Uzbek Republic Radio Center, answers this question in his letter.

The production laboratory must, above all, assist the operating personnel in establishing the optimum operating conditions of the radio station equipment and develop the most effective methods of preventive maintenance. A no less important part of the activity of the laboratory is the measurement of the qualitative indexes of the equipment and their improvement. However, this matter is complicated by the fact that there is but little high-quality measuring equipment in the laboratories. At the present time measurement of the qualitative indexes of a broadcast transmitter under conditions of intense interference from other transmitters in the equipment room requires much skill and experience on the part of the measurements group. For precise measurement of the noise level under such conditions it is sometimes necessary to shut off adjacent transmitters. Additional shielding of the measuring equipment or its removal from the room does not always provide the desired results and is not always possible. Equipping radio transmitting stations with improved measuring equipment would contribute to a considerable saving in time and increase the accuracy of measurements.

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An increase in the productivity of labor is provided by the introduction of more advanced methods of operating equipment and by technical improvements in the equipment itself. Rationalization and invention play an important role in this matter. The production laboratory assist in organizing the work of rationalizers and inventors and extends them all possible technical assistance. Sometimes in presenting an interesting idea a rationalizer may not be able to provide a concrete technical solution for it. In this case the laboratory must assist the rationalizer in developing an improved circuit for the proposed unit, assist in making it, test it, and place it in operation.

At radio stations automatization of the control and tuning of transmitters as well as of the monitoring of their operation permits an increase in the number of transmitters serviced by personnel without increasing the total number of shift personnel. The production laboratory may be of no little help in this matter as well.

Comrade Avak'yants writes that the laboratory of the transmitting station of the Uzbek Radio Center designed and constructed a rack for automatic monitoring of a transmitter operating in a FSK-SCFT (frequency-modulated, frequency-shift-keying telegraph) system. This rack automatically monitors the operation of each channel and signals the interruption of keying on a channel within 8 seconds. It also automatically checks the quality of operation of each channel and signals defective operation of the equipment (reverse operation, bias and deterioration of signal components). The rack employs the principle of automatic comparison of the signals at the input and output of the transmitter, in which such comparison may be carried out with varying degrees of accuracy. The principal drawbacks of the monitoring rack are its complexity and high cost. However, with the proper assistance from the scientific research organizations these shortcomings may be eliminated. Regrettably, in examining the monitoring rack and noting its shortcomings, the engineering department of the Main Radio Administration of the Ministry of Communications USSR did not indicate any means of improving and simplifying the design. This would have been extremely helpful.

The production laboratory had also developed and placed in operation a number of devices contributing to an increase in the quality of radio communications and broadcasting. Among these is a voice-frequency amplifier-rectifier (TUV) for operation at increased keying speeds, which prior to the appearance of the standard TUV insured high-quality operation of radio communications channels for a year. There was recently completed an experimental model of an electronic switch for an oscillograph, permitting four time bases on the screen of an ordinary oscillograph. The design principle of the mentioned system permits making a similar switch for simultaneous observation of any number of electrical processes. The installation of such switches in local and distant points will permit a reduction in the number of oscillographs and permit an increase in the effectiveness of control in the broadcasting.

At present there is observed a certain lack of systematization in the creative activity of many production laboratories, with the result that each laboratory determines its own direction according to local conditions. As a result of the lack of an exchange of opinions and the lack of planned guidance in this field, upon beginning the development of a new unit it is not always possible to vouch for the correctness of the chosen direction or the necessity for the given development. Hence, it would be useful to systematize and specify the creative work of the personnel of production laboratories. The assignment of a single task for rationalizers and inventors by the Ministry of Communications USSR is in this case unattainable.

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Laboratory engineer Comrade Klyuchev of the laboratory of production measurements of the Gor'kiy DRTS [Directorate of Wire-Broadcasting Network] reports that work there is conducted in several directions.

The first task confronting the workers of the laboratory was to achieve an increase in the power of low-frequency amplifiers. This is achieved by performing periodic measurements of standard apparatus and increasing its power. In particular, the laboratory has taken part in developing a scheme for increasing the power of the WUC-500 amplifier to 2,400 watts. This scheme has been approved by the Ministry of Communications USSR. Moreover, the workers of the laboratory together with the DRTS shop have increased the power of the WUC-500 amplifier to 2,000 watts and about ten of these radio units with increased power are now in operation in Gor'kiy Oblast.

The second task is the development and introduction of circuits for automatization and remote control. With the cooperation of the workers of the laboratory circuits were developed for automatizing the TU-5 amplifier, remote feeder measurement, etc.

And, finally, the third task of the laboratory is the organization of all the rationalizer activity at the DRTS. The coworkers of the laboratory give the rationalizers consultative advice, assist them in performing experimental work. They have prepared many subjects for the rationalizers and lists of recommended literature. They conduct technical conferences on individual rationalizer proposals.

However, the laboratory workers encounter a number of difficulties which they have not succeeded in eliminating on their own. The laboratory exercises departmental supervision over instruments and repairs them. But components for the repair of these instruments are not at hand and they are not yet regularly supplied. In addition, the laboratory workers must often travel about the byways of the oblast and the equipment which they carry with them is very heavy and unreliable.

It is time that the Ministry of Communications USSR adopted measures to provide the laboratories with the spare parts and components they require. The Ministry must also give some attention to creating inexpensive, light, and reliable equipment employing semiconductor devices. Such inexpensive and light equipment must also be developed for locating faults in underground lines used for rural radiofication. The laboratories are also in need of equipment for circuit measurements in VRS [intra-rayon communications].

Comrade Pugach, senior engineer of the production laboratory of the Kiev Directorate of Radio Communications, writes of the underestimation of the importance of the production laboratories.

Comrade Pugach expresses regret that up till recently this laboratory has been engaged in work which could have been performed directly at shop for operating personnel. In effect, it had been converted into a repair and alignment shop. This state of affairs was sharply criticized by the All-Union Conference of Industrial Workers at the Kremlin. After it the Kiev Directorate of Radio Communications and broadcasting designated certain measures for strengthening the laboratory and increasing its authority.

A laboratory with a staff of eight persons could not meet all the needs of the radio enterprise. Hence the engineer-laboratory workers of the enterprise were transferred to the laboratory of the Directorate, which permitted considerable improvement in its activity. Thanks to

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workers of the laboratory were previously engaged in work which was not their proper duty, now the entire staff of the laboratory is working according to assignment. Part of the workers of the laboratory are engaged in the periodic checking and repair of measuring instruments, the checking of protective devices provided under the safety regulations, the checking of vacuum-tube production delivered to the directorate warehouse, and in control measurement of the qualitative indexes of technical facilities.

The above-listed production duties must, of course, be performed, but the result is that of the entire staff only 4 persons are engaged in laboratory operations. With the large volume of technical facilities and with the participation in solving all kinds of problems arising in the process of operation, such a number of laboratory workers is inadequate. There naturally arises the question of expanding the laboratory and re-equipping it. It is necessary to have measuring instruments in sufficient quantity and quality as well as a base for such experimental operations and new developments as are necessary for improvement of the qualitative indexes of technical facilities and for the introduction of new techniques. Without experiment and without investigation of production processes it is impossible to improve the operation of enterprises.

Despite these difficulties, the laboratory is now coping with the problems of increasing the efficiency of broadcasting stations and improving the quality of broadcasts. For this purpose experimental operations are being conducted with models in order that the grid system of modulation may soon be replaced by a more effective system and in order to increase the efficiency and output power of a transmitter without extensive changes in its circuitry.

The laboratory has done much work in reducing television interference. Harmonic filters have been installed in all short-wave transmitters. The laboratory has also developed a station for relaying transmission of the Kiev Television Center on channel 3, which will permit expansion of the service area of the telecenter. This station has now been delivered to Zhitomir where final adjustment and familiarization runs are underway.

The laboratory has set up a stand for popularization of the latest developments in radio engineering. It is proposed that this stand provide regular information concerning Soviet and foreign achievements in communications engineering and by this means to direct the attention of rationalizers and inventors to the solution of various concrete problems. The engineering-technical staff of the laboratory provides regular consultative advice for rationalizers. Their more valuable proposals are carefully examined and checked by the laboratory.

Further improvement of the work of the laboratory may be of much assistance to the scientific research institutes of the Ministry of Communications USSR. In their daily activity they must maintain close contact with the laboratories. It is also useful to organize an exchange of work experience between the production laboratories of the communications enterprises.

Comrade Fel'dtser, leader of the measurements laboratory of the administration of one of the cable trunks, correctly notes that the technical level of an enterprise may be judged from the condition of its production laboratory. The production laboratory has the first word in the mastery and introduction of new, advanced techniques and in the

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development of new instruments and individual equipment units. Hence, the manager of the enterprise should give thorough attention to the production laboratory.

But this is not always the case. This particular production laboratory has been at the administration of the given cable trunk for three years. During this time it has dealt with many operational problems and has almost never been engaged in the solution of a problem of technical progress. This is explained by the fact that the staff of the laboratory has never consisted of more than three persons and that it was not located in separate production premises.

Only recently has the laboratory obtained its own premises. Installed there are several racks of long-distance communications equipment and a power panel, and the installation of work positions is in progress. However, conditions have changed but little. As of old, the measurements laboratory is the most out-of-date department of the enterprise in its technical equipment and manning with skilled workers able to perform experimental work with high technical accuracy. The laboratory is unjustly ignored by the management of the cable trunk and by the Ministry of Communications USSR.

In the construction of a cable trunk it would be fully regular to plan for the creation of a production laboratory. Actually, this trunk is provided with the newest techniques, but the equipment is a matter for consideration at a much later date.

Under the head of capital construction for the laboratory no provision is made for apparatus, instruments, or machine-tool equipment. Naturally, this has a telling effect on the work of the enterprise.

Over the entire trunk there is now a large number of measuring instruments. For the periodic testing of these instruments (the laboratory is charged with the function of departmental supervision) there is not one instrument of class 0.2, there are no sensitive galvanometers, no oscillograph, and calibrating instruments and reference standards are completely lacking. During 1955 the laboratory did not receive a single measuring instrument.

At present the laboratory of the administration of the cable trunk is engaged in increasing the traffic capacity of the trunk, devotes much time to protection of trunk cables against electrical corrosion, checks and adjusts the automatic units of new equipment, and performs a number of other operations. However, due to the previously mentioned difficulties, the laboratory is not in condition to solve many of the problems now confronting it.

The production laboratory of the Leningrad Directorate of Radio Communications and Broadcasting has been in existence more than ten years. We read in the letter of Comrade Askinaza, director of the laboratory, that during this time it has performed much work directed toward the improvement of radio communications and broadcasting facilities. Among these works: revision of the project and direct execution of the reconstruction of the Leningrad Radio House; development and construction of a deviameter; recalculation and tuning of units for operation of two transmitters on one antenna; development and construction of a remote-measurement receiver; design and construction of switching, monitoring, and amplifying racks for most of the installations of the directorate; organization of the monitoring and measurement of the qualitative indexes of radio stations; a number of other operations.

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The laboratory devotes much time to various operations directly at the installations and to hook-up work in building new equipment and modernizing existing equipment. All of its practical activity is closely associated with the needs of the installations and is directed almost exclusively to increasing the technico-economic indexes of radio stations and introducing new techniques.

But in the light of the decisions of the July Plenum of the TsK KPSS it became evident that it was necessary to reorganize the work of the production laboratories, to convert them into centers for the introduction of all that is new and advanced in engineering. Hence it is first necessary to free the laboratories from less important operations which may be performed by the shops, assembly organizations, and the personnel of the radio stations.

On the basis of long experience the author of the letter came to the conclusion that the production laboratories at radio directorates must cope with the following problems: improving the operation of radio facilities and increasing their technico-economic indexes; providing technical assistance in the reconstruction and repair of equipment (solving circuit problems, calculations, tuning, testing models); modernization of equipment on the basis of operational experience, the developments of scientific research institutes, and rationalizer proposals; organizing measurement of the qualitative indexes of equipment; developing measurement procedures for radio equipment; developing technical specifications for apparatus; generalizing experience in the operation of radio apparatus and introducing new methods of operation; research work of an applied nature in improving the use of radio communications and broadcasting facilities; achieving direct contact with the scientific research institutes and industry; rendering concrete assistance to production innovators, rationalizers, and inventors.

In assisting the production laboratories the Ministry of Communications USSR should organize extensive information on the operations of scientific research organizations, on new apparatus produced by our industry, and must systematically acquaint them with new developments in foreign engineering. The almost complete absence of booklets and handbooks needed by the laboratories severely impedes their work. Nor do they receive information bulletins and foreign literature. All this hinders the creative thinking of inventors and rationalizers and often leads to work on problems which have long since been solved.

The most important condition for successful reorganization of the work of the laboratories is the manning of those laboratories by a skilled staff and the provision of modern measuring apparatus.

The Leningrad directorate has revised the production plan of the laboratory with its orientation in the direction of an intensified development program and the introduction of new techniques; it has also designated a number of measures freeing the laboratory from installation and repair work. For this purpose in the existing repair-production group there will be organized an installation section for performance of installation work in connection with new developments and the wiring of apparatus.

Comrade Gurvits, leader of the production laboratory of the Kiev City Telephone Network, asserts that reorganization of the work of production laboratories is unconditionally necessary in the light of the decisions of the Party and the government, which decisions have

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presented a number of new tasks. However, the question is often one of the creation of production laboratories rather than of reorganization. What are the laboratories at most of the city telephone networks? At best, they are small measurement brigades which are constantly engaged in monotonous work -- the performance of planned electrical measurements -- or they execute the individual technical assignments of the network manager. If the staff of the laboratory is slightly in excess of that required for a measurement brigade, this is usually regarded as a standby technical force for operational purposes.

Many of the functions with which the so-called laboratories are charged should be performed by the operational technical personnel. As a rule, the laboratories are merely provided with measurement instruments for the performance of planned electrical measurements. And they have nothing but the simplest instruments with which to carry out necessary technical testing of equipment, apparatus, articles, and various units used in the GTS [City telephone network].

It is clear that the existing conditions at production laboratories have long been outmoded. In these conditions there are defined in a few words the purpose, tasks, and functions of the production laboratory. However, there is not one document which lists the technical equipment needed by a laboratory for the fulfillment of the tasks stemming from these conditions. In this connection, at those production laboratories (in the larger networks) which, in addition to the planned measurements, are nevertheless engaged with certain other problems, much of the time is devoted to the creation of various units and appliances in carrying out individual assignments presented to the laboratories.

Thus, reorganization of the work of production laboratories should begin with the provision of technical equipment and the assignment of skilled personnel able to engage in the solution of serious technical problems. Under such conditions certain problems confronting the scientific research institutes could be solved by them in collaboration with the production laboratories, which would facilitate achievement of the most rapid and practical results. Participation of the laboratories in such work would raise the level of scientific knowledge of operational engineering-technical workers and would put an end to that negative state of affairs in which large numbers of engineers, engaged for many years in monotonous operational activity, gradually lose their technical know-how and with respect to theoretical knowledge differ but little from technicians.

In this connection, the following example will indicate the importance of the role which could be played by production laboratories in the development of complex technical problems. Approval of the plan for expanding the Kiev GTS has been delayed for several years due to the absence of technical solutions permitting joint operation of the ATS's [automatic telephone exchanges] now in use in Kiev with the newly designed ATS-47. The Ministry of Communications USSR assigned this development to LONIIS [Leningrad Oblast Scientific Research Communications Institute]. However, to date the latter has done nothing with this problem. At the beginning of 1954 the production laboratory of the Kiev GTS took the initiative and set about developing apparatus for combined operation of the two systems. This work is now completed. The production laboratory made experimental models, performed all the necessary tests under laboratory and natural conditions, prepared technical instructions containing all the necessary calculations, specifications, etc. With the

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exception of minor details, the mentioned development was given the finishing touches at IONIIS. In 1955 two sub-exchanges were placed in operation in connection with the abovementioned development of the production laboratory. From one of these sub-exchanges communications are established along two-wire junction lines, the RSL [junction-line relay] assemblies for which were also developed by the production laboratory.

The above example and a number of others show that the production laboratories of large networks are capable of solving individual important problems independently or in collaboration with scientific research institutes. Regrettably, this mighty reserve of scientific research work has been little used to date by the Ministry of Communications in a planned manner.

If the production laboratories were to be technically equipped and provided with skilled cadres, then they would undoubtedly play an important role in improving and developing communications techniques in the Soviet Union.

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